Air Velocity and Temperature Probe
F400 Series

Covered under
US patent 6,829,930

application

- Biological Safety Cabinets
- Chemical Fume Hoods
- Laminar flow hoods
- Clean Benches
- HEPA & Filter Boxes
- Heat Exchangers
- Air Flow Ventilation
- Energy Balance Testing
- Data Racks

The F400 series is a versatile and rugged, high-performance air velocity and air temperature sensor with both analog and digital communication outputs. Designed with conformal coated electronics and sealed enclosure, the F400 is suitable for demanding applications, including those in corrosive or alkaline environments. With its robust, splash proof design, and UV tolerant construction, the F400 is designed to handle a wide range of product and process control air flow applications. The F400 series is configured to order, with a variety of velocity ranges, mechanical lengths, and output communication styles.

Mechanical Features:

- Innovative "outside the duct" installation: Single hole for mounting sensor assembly, without need for screws, or hands inside the duct!
- Optimized flow geometry with segregation of velocity and temperature elements for highest accuracy.
- Aerodynamic cross section to minimize flow disturbance.
- Robust, sealed probe assembly uses corrosion and UV resistant materials.
- Printed insertion depth markers and flow direction arrow.
- Conformal coated sensing elements for environmental protection.
- 2m [6 ft] plenum-rated cabling suitable for HVAC, laboratory and process control applications.
- RoHS compliant

Electrical and Performance Features:

- 3% air velocity performance, with repeatability within 1%.
- 1% air temperature accuracy.
- Best in class acceptance angle performance.
- Wide voltage input 12-24 VDC.
- Configurable voltage output for velocity AND temperature.
- Multiple digital outputs available.
- Configurable alarm output for air velocity or air temperature.
- Multi-sensor addressing capability.
- Intelligent, built-in customizable averaging/ smoothing functions
- <10 second start-up time and 400ms response time

Degree Controls, Inc.

is an ISO-9001 certified world-class Designer and Turn-Key Manufacturer of control solutions for progressive technology industries. With over 15 years of proven experience, we pride ourselves in delivering solutions to our customers that provide the differentiation they need for their rapidly changing competitive landscape.

RoHS CE MADE IN U. S. A.

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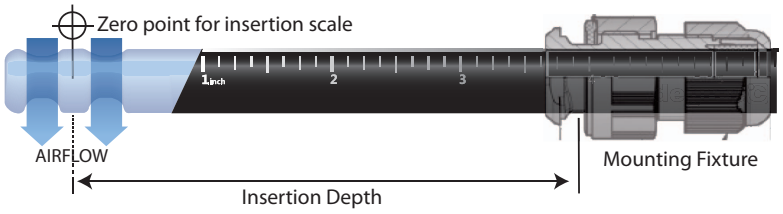
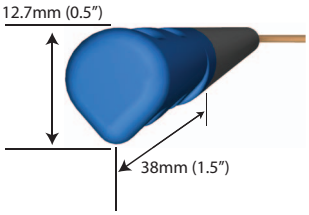
Air Velocity and Temperature Probe – F400 Series





mechanical sizes and installation

Four Tube Lengths for insertion depth:
Minimum = 30mm (1.25") measured from tip of sensor.
Maximum = 240mm (9.5")
See chart below for all sizes, ask about custom sizes to fit your application.

configuration options

Select from Velocity Ranges:
Customizations available upon request.

- .15 – 1.0 m/s [30-200 fpm]
- 0.5 - 10.0 m/s [100-2000 fpm]
- 1.0 – 20.0 m/s [200-4000 fpm]*

* This flow range may require 24V input, depending on temperature range required

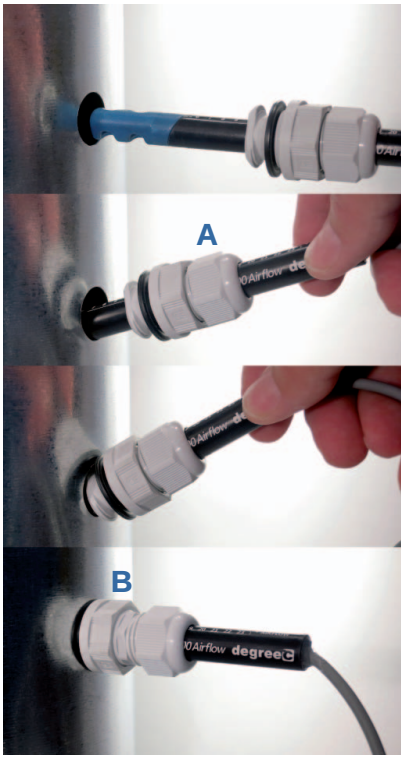
Select Communication Style:
(mixing analog and digital outputs is possible, call for help)

- 0 – 5 VDC air velocity output only
- 0 – 5 VDC air temperature output only
- 0 – 5 VDC air velocity and air temperature (dual outputs)
- 0 – 10 VDC air velocity output only
- 0 – 10 VDC air temperature output only
- 0 – 10 VDC air velocity and air temperature (dual outputs)
- UART communication output
- I²C (3.3 VDC) communication output (addressing available)

have you considered?

- Calibrate for very low flow applications.
- Configure as an air velocity switch for binary applications. (see S400 Series datasheet)
- Optimize air velocity averaging for your applications.
- Need a faster response time for your application?
- Output as fan controller.
- Customize temperature or velocity ranges for your application.
- Output to a simple display.
- Configure with 24VAC input

Unique, screwless, single-sided installation



Gland Fitting Insertion
Drill 7/8" 0.75" (20mm) hole.

- Adjust insertion depth and tighten (A) gland nut onto sensor probe.
- Insert into duct hole, with wider flange first, then rotate into position.
- Tighten mounting nut (B) in left-hand direction.
- Make sure the sensor head is aligned by positioning the arrow in the direction of airflow

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specifications

Operating temperature range:	10°C to 60°C (50°F to 140°F) *
Velocity range:	0.15m/s – 20m/s (30 fpm – 4000 fpm)
Response time:	400m/s
Storage temperature:	-40°C to 85°C (-40°F - 185°F)
Relative humidity (non-condensing)	5-95%
Supply power requirements:	+12 - 24VDC, 10mA nominal
Velocity Output:	0-5V or 0-10V output
Temperature output:	0-5V or 0-10V output
Digital output:	UART or I^2C available for flow and temperature information.
Alarm trip points:	Configurable
Housing:	Polycarbonate UL94 V0
Plenum rated cable:	18 AWG
Environmental Protection:	IP50, conformal coated sensing element

accuracy

Repeatability ±1% of reading (under identical conditions)

Air Velocity Range	Air Velocity Accuracy*
0.15 to 1.0 m/s (30 to 200 fpm)	± (1% of reading + 0.05 m/s [10 fpm])
0.5 to 10 m/s (100 to 2,000 fpm)	± (4% of reading + 0.15 m/s [30 fpm])
1.0 to 20 m/s (200 to 4,000 fpm)	± (5% of reading + 0.15 m/s [30 fpm])

*at standard conditions

compensation

Air Temperature Measurement Accuracy: ±1°C (1.8°F)
Resolution: 0.1°C

Temperature Compensation Range: The F400 is a thermal airflow sensor; it is sensitive to changes in air density and indicates velocity with reference to a set of standard conditions (21°C (70°F), 760mmHg (101.325kPa), and 0%RH). The F400 has been designed so that when used over the stated temperature compensation range, the sensor indicates very close to actual air velocity and minimal compensation is only required to account for changes in barometric pressure or altitude. Changes in relative humidity have a minimal impact and can usually be ignored.

part number format

F400 - L - V - O

L = Sensor Length

1 = 114mm [4.5"] max insertion depth = 61 mm [2.7"]
2 = 152mm [6.0"] max insertion depth = 110 mm [4.3"]
3 = 211mm [8.3"] max insertion depth = 169 mm [6.7"]
4 = 287mm [11.3"] max insertion depth = 245 mm [9.6"]

V = Velocity Profile

A = 0.15 – 1.0 m/s [30-200 fpm]
B = 0.5 - 10.0 m/s [100-2000 fpm]
C = 1.0 – 20.0 m/s [200-4000 fpm]

O = Output Configuration

1 = 0 – 5 VDC air velocity output only
2 = 0 – 5 VDC air temperature output only
3 = 0 – 5 VDC air velocity and air temperature (dual outputs)
4 = 0 – 10 VDC air velocity output only
5 = 0 – 10 VDC air temperature output only
6 = 0 – 10 VDC air velocity and air temperature (dual outputs)
7 = UART communication output
8 = I^2C (3.3 VDC) communication output (addressing available)

The **F400 AC-series**, specifically designed for 24V AC HVAC applications and Staefa compatibility is readily available. See the corresponding datasheet for details.

Contact Degree Controls for more F400 companion products.

- S400 Airflow Switch
- M400 Mass Airflow Sensor

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